

**Notice of Allowability**

Application No.

10/813,176

Examiner

Jennifer M. Dolan

Applicant(s)

SHIBATA, MASATOMO

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to AF Amdt of 6/4/07.
2. ☒ The allowed claim(s) is/are 1,2,10,13,17-24 and 46-55.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☒ All b) ☐ Some\* c) ☐ None of the:
    1. ☒ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  5. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO/SB/08),  
Paper No./Mail Date 6/5/07
4. ☐ Examiner's Comment Regarding Requirement for Deposit  
of Biological Material

5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413),  
Paper No./Mail Date \_\_\_\_\_
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_

  
CARL WHITEHEAD, JR.  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800

### **DETAILED ACTION**

*This action is in response to the Amendment after Final, filed 4 June 2007*

#### ***Examiner's Amendment***

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

The application has been amended as follows:

In claim 54, line 1: "25" has been deleted

#### ***Allowable Subject Matter***

2. Claims 1, 2, 10, 13, 17-24, and 46-55 are allowed.
3. The following is an examiner's statement of reasons for allowance:

The primary reason for allowance is that there are no teachings in the prior art of record of a self-supported III-V nitride substrate expressly having the claimed carrier concentration uniformity, no teachings of structures or methods that should be reasonably expected to have the claimed degree of carrier concentration uniformity, and no teachings of methodologies substantially similar to that disclosed in the instant invention, such that uniformity of the degree claimed would be expected.

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The Applicant's arguments filed 4 June 2007 are largely considered persuasive, and the Examiner offers the following comments:

Regarding US 2003/0134493 to Cho, the Examiner notes that Cho only indicates that the germanium dopant concentration from the neutron transmutation method is extremely uniform, but fails to indicate the initial distributions of other non-intentional dopants present in the substrate. Since the Applicant's evidence (the Kim et al.) publication, indicates that non-intentional dopant incorporation for layers grown in a method similar to that in Cho could result in carrier concentrations in the range of  $1E17 - 1E19 /cm^3$ , and since Cho fails to specifically quantify the carrier concentration uniformity for all of the dopants, the Examiner cannot reasonably assume that Cho would exhibit the claimed carrier concentration uniformity.

Similarly, regarding US 2002/0046693 to Kiyoku et al., the Examiner notes that while the methods used in Kiyoku are similar to those disclosed in the instant specification, such as use of HVPE and growth of the self-supported substrate on a "flat" GaN layer, the methods are not identical. The Examiner notes that the flat GaN surface in Kiyoku displays different crystallinity, defect shape, and defect distribution than the GaN surface resulting from the method disclosed in the instant specification, such that the self-supported GaN layers grown upon the flat surface will also exhibit different crystallinity, defect shape, and defect distribution (also see page 7, paragraphs 1-2 of the 6/4/07 Applicant's remarks). Since Kiyoku only indicates that the surface defect density is reduced, without in any way quantifying the uniformity of the carrier concentration, and since the instant specification indicates that there is not necessarily a direct correlation between defect distribution and carrier concentration uniformity (see page 4,

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first paragraph), the Examiner cannot reasonably conclude that the substrate in Kiyoku would exhibit the claimed carrier concentration uniformity.

All of the remaining prior art suffers from similar defects as Cho and Kiyoku, in that they neither quantify expressly or implicitly a degree of carrier concentration uniformity in the claimed range for a III-GaN self supported substrate, nor do they teach substantially similar methods to that in the instant specification to thereby necessitate similar concentration uniformities. While it is apparent that improved carrier concentration uniformity would be a desirable trait, it is the Examiner's opinion that a person having ordinary skill in the art would not be able to fabricate such a substrate except by using the disclosure of the instant application.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer M. Dolan whose telephone number is (571) 272-1690. The examiner can normally be reached on Monday-Friday 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl W. Whitehead, Jr. can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jennifer M. Dolan  
Examiner  
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jmd